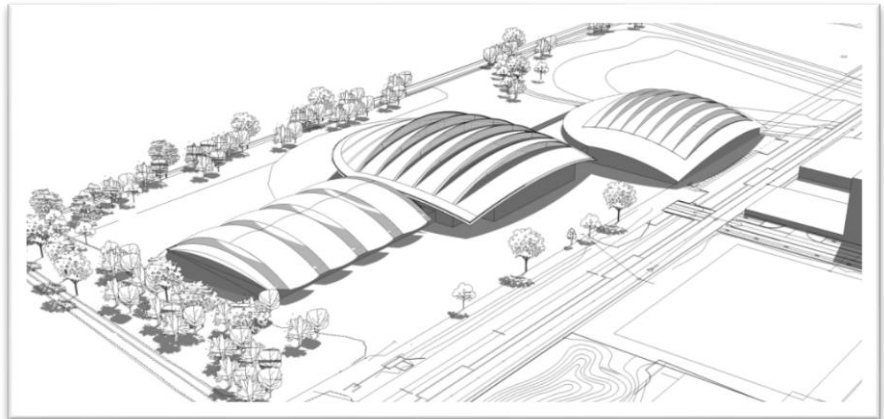


2013

University of Cambridge



SPORTS CENTRE: BUILDING USER GUIDE

Madingley Road, Cambridge University West Campus, CB3 0ES

The project team

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Summary

Purpose of this Building User Guide (BUG)

This 'Building User Guide' (BUG) contains the necessary details about the everyday operation of the building in a form that is easy to understand for the intended building users; University of Cambridge students and staff, visitors and facilities management (FM) personnel. The overall aim is to ensure that design features are used efficiently and that changes to the building are managed in an appropriate manner.

By providing this information and guidance, it is more likely that the building will be used efficiently, that occupants will be satisfied with the building and that there will be less wastage of resources. This BUG has been developed in accordance with the compliance criteria for BREEAM credit Management 4.

This BUG is, in addition to the health and safety file required by the Building Regulations Part L, to be provided to the owner and/or occupier of the building. This BUG is also, in addition to the Health and Safety file, required by the Construction Design and Management Regulations to be passed onto the building user on completion.

General Description of Building

The Cambridge Sports Centre comprises the £16 million Phase One of the West Cambridge University Masterplan.

The sports centre entrance lobby and reception contains a media wall for TV and building user information. A café occupies part of the lobby space for the enjoyment of all, either pre or post-game. From this area, through a glass partition, is visible the fitness suite with a full range of state-of-the-art cardiovascular equipment.

At the core of the Centre is an 8 court multipurpose sports hall, with court marking to include badminton, basketball, volleyball, netball, Korfball, five-a-side football and other court games.

There is a strength and conditioning wing, with free-weights platforms and a two-lane plyometric track.

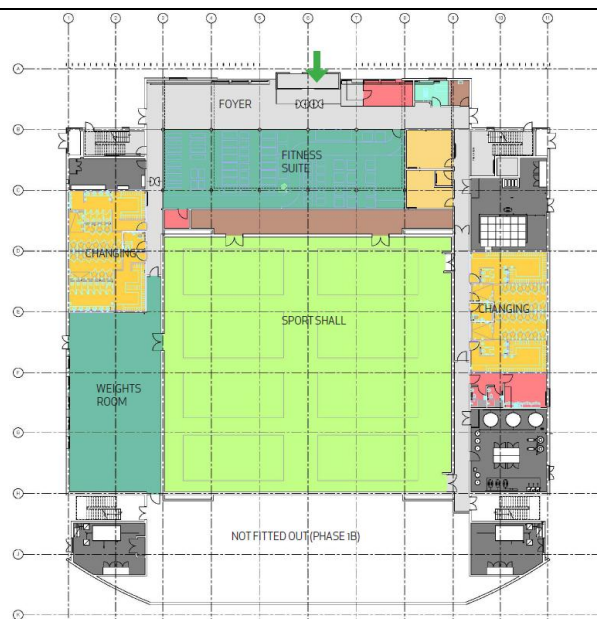
A large multi-purpose room caters for the martial arts, yoga, spinning, and floor-based exercises including fencing, dancing and gymnastics.

Floor usage summary

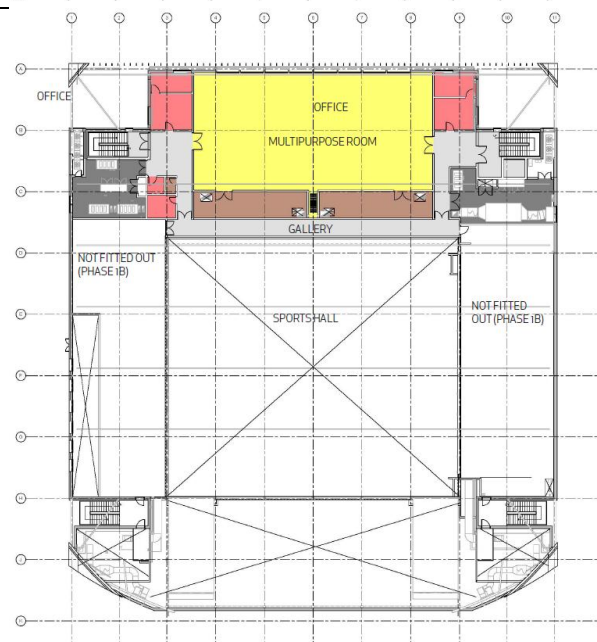
6,060m² gross internal area (GIA)

4,600m² dedicated sports and recreation facilities

- Entrance foyer
- Multipurpose sports hall
- Fitness suite
- Weights room
- Squash courts
- Multiple changing rooms
- Health suite
- Equipment store
- First aid
- Offices
- Plant and facilities areas



- Multipurpose room
- Fencing & table tennis
- Fives courts
- Stores
- Offices
- Viewing gallery
- Plant rooms



Building Services Information

Building Services Information

Internal design temperatures within each space vary due to nature of sports events and different uses within the building. The criteria shown in the adjacent table are based upon various CIBSE and Sport England Guides. The following table provides a summary of the required internal design conditions.

<i>Space</i>	<i>Heating temperature</i>	<i>Cooling temperature</i>	<i>Ventilation</i>
General space	19°C	Up to +3°C above ambient	Naturally ventilated
Main sports hall	12-16°C	Up to +3°C above ambient	Mechanical ventilation: up to 10l/s/person, or, 0.5 air-changes/hour
Fitness centre	18°C	20±2°C	Mechanical ventilation: up to 20l/s/person
Weights room	18°C	20±2°C	Mechanical ventilation: up to 20l/s/person
Changing rooms	20-25°C	Up to +2°C above ambient	Mechanical ventilation: 10 air-changes/hour
Multipurpose room	18°C	20±2°C	Mechanical ventilation: up to 20l/s/person

General Users

Effective heating and cooling systems are important to provide a comfortable indoor environment.

Heating and cooling

The temperature is monitored by sensors connected to the building management system (BMS). If you wish to adjust the temperature then contact a member of facilities management staff. Relevant contact details can be found at the rear of this document.

Ventilation

The UoC sports centre is a mixed mode building which can be naturally ventilated when conditions allow. To maintain conditions, a full fresh air mechanical ventilation system is also provided.

Ventilation requirements are monitored by sensors connected to the building management system (BMS). If you wish to adjust the ventilation then contact a member of facilities management staff. Relevant contact details can be found at the rear of this document.

Do not block the flow of air either into or out of the ventilation grilles as this can affect the ability of the heating/cooling system to work effectively therefore wasting energy.

Lighting

Presence detection is provided within all store rooms, cleaners cupboard, server and repro room, staircases, circulation routes, lift, WC's, showers and changing rooms. Absence detection is installed within all offices, meeting rooms, first aid room, fitness suite, and weights room. Plant rooms manually switch for the purposes of safety.

Some internal spaces with windows are installed with daylight linking in order to achieve a high building lighting energy efficiency. Where dimmable luminaires are supplied the daylight linking will dim the internal luminaires to predetermined levels in order to achieve the targeted illuminations.

All spaces with daylight linking are provided with manual overrides for maximum flexibility.

Lifts

The University of Cambridge Sports Hall building is provided with a single 21 person 1700Kg machine-room-less evacuation lift. The lift car has a clear door opening width of 1400mm and a clear height of 2100mm to allow transportation of specialist sports equipment identified by the University. The lift speed is 0.5m/s.

Do not exceed the maximum capacity.

Do not operate the lifts in a fire or when instructed for other reasons. In case of emergency use the communication panel within the lifts to call for assistance.

Facilities Management

Heating

The primary heating source for the building is modular gas fired condensing boilers. The boilers are located in the ground floor plant room (southeast). The primary heating source for the building is modular gas fired condensing boilers with primary pumps feeding a low loss header.

The operating temperatures of the LTHW heating system are 60/40°. The building heating requirement is 340kW: therefore 3no. 140kW (heat output) boilers are used. This provides an additional 25% capacity as required by the University of Cambridge Estate Management Design and Standards guide.

The boiler circuit is provided with pressurisation set, de-aerator, dirt separator and dosing pot.

Pumped secondary heating circuits are provided for the following;

- AHU circuit – Constant temperature, variable volume circuit for AHU heating coils.
- Radiator/Radiant Panel Heating circuit – Constant temperature, variable volume circuit.

Variable volume pumps are inverter driven and all pumps are duplicate sets for run and standby operation. All pumps are of single head type. Pressure differential control valves are provided to AHU branches and specific locations for the radiator circuit as detailed on the schematics.

Valved connection points are provided for the future possible interconnection of CHP pipework from the future phase 3 swimming pool construction.

Cooling

Variable Refrigerant Volume (VRV) / Variable Refrigerant Flow (VRF) systems are provided for space and air handling plant cooling requirements.

External condensing units are located in louvered areas at first floor plant room level below the roof line. Vents are provided in the roof over these areas to allow for the required heat rejection. Space provision is allocated for the future installation of a condenser unit for the future multipurpose area.

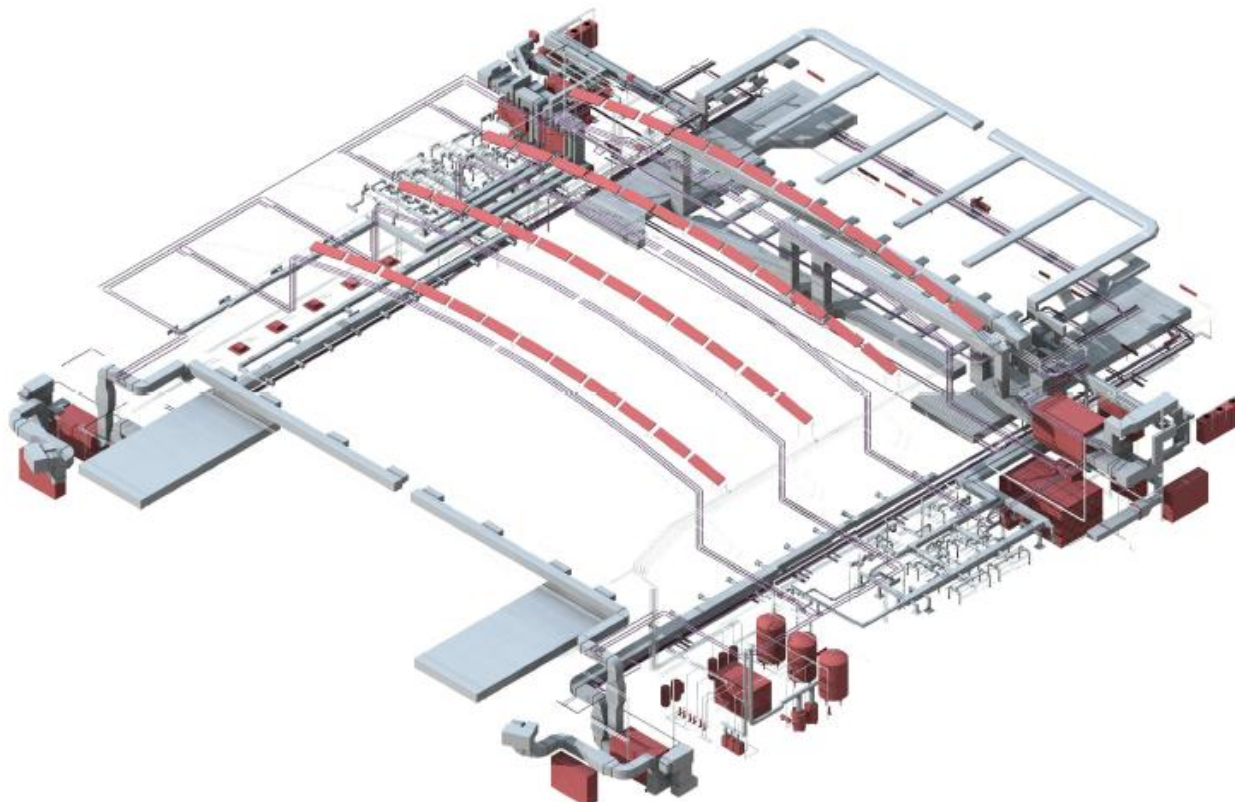
Condenser units are provided and connected to spaces to minimize the number of units required. Space has been allocated based on the following;

<i>First Floor West</i>	<i>First Floor East</i>
Multipurpose West / Server 45kW (1no. condenser)	Fitness AHU load 135 kW (3no. condensers)
Weights / Office / Server 45kW (1no. condenser)	Multipurpose East 40kW (1no. condenser)
Future Multipurpose 40kW (space for 1no. condenser)	

The VRV/VRF system for the weights and multispace areas also provides space heating when required, reducing the required load for heating from gas fired boilers.

The changing rooms are designed to use integrated cooling units which are to use R134A refrigerant and are required to operate at a COP of 4.6. All other VRV/VRF systems have externally located condensers and are to use R410A refrigerants. The Fitness Suite bank of outdoor condenser units is required to operate at a minimum EER of 3.48. All other units shall be individual and are required to operate at a minimum EER of 4.13.

Ventilation



Sports hall

The sports hall is a mixed mode space which can be naturally ventilated when conditions allow. Rooflights at high level within the space are motorised and BMS controlled. They operate in conjunction with four ducted inlets located above head height on the ground floor.

At extreme low ambient external temperatures, the natural ventilation openings are controlled closed and LTHW radiant heating panels operate. Each row of radiant panels is controlled by 2 port motorised valves operating from 'black bulb' temperature sensors.

To maintain conditions, a full fresh air mechanical ventilation system is also to be provided. The air plant is located in ground floor plant rooms and provided with attenuators, panel and bag filtration, hygroscopic thermal recovery wheel, LTHW frost and re-heat coils. In winter, the air is tempered to 3° below the target temperature of the radiant panels.

CO₂ space sensors control fresh air plant, which provide filtered and tempered fresh air to the space. Air is ducted to the sports hall via corridor ceiling voids and introduced by side wall 'eye ball' type jet nozzle diffusers.

Extract air is from the highest possible level at one end of the hall via architectural wall panels. The mechanical ventilation also operates at high ambient external temperatures with the radiant panels controlled 'off'.

Dependent on wind, rain, temperature and CO₂, the mechanical ventilation is controlled 'off' by the BMS and the natural ventilation modulated as required via the low and high level openings.

A user override switch will be located in the reception back office to allow the BMS control to be overridden.

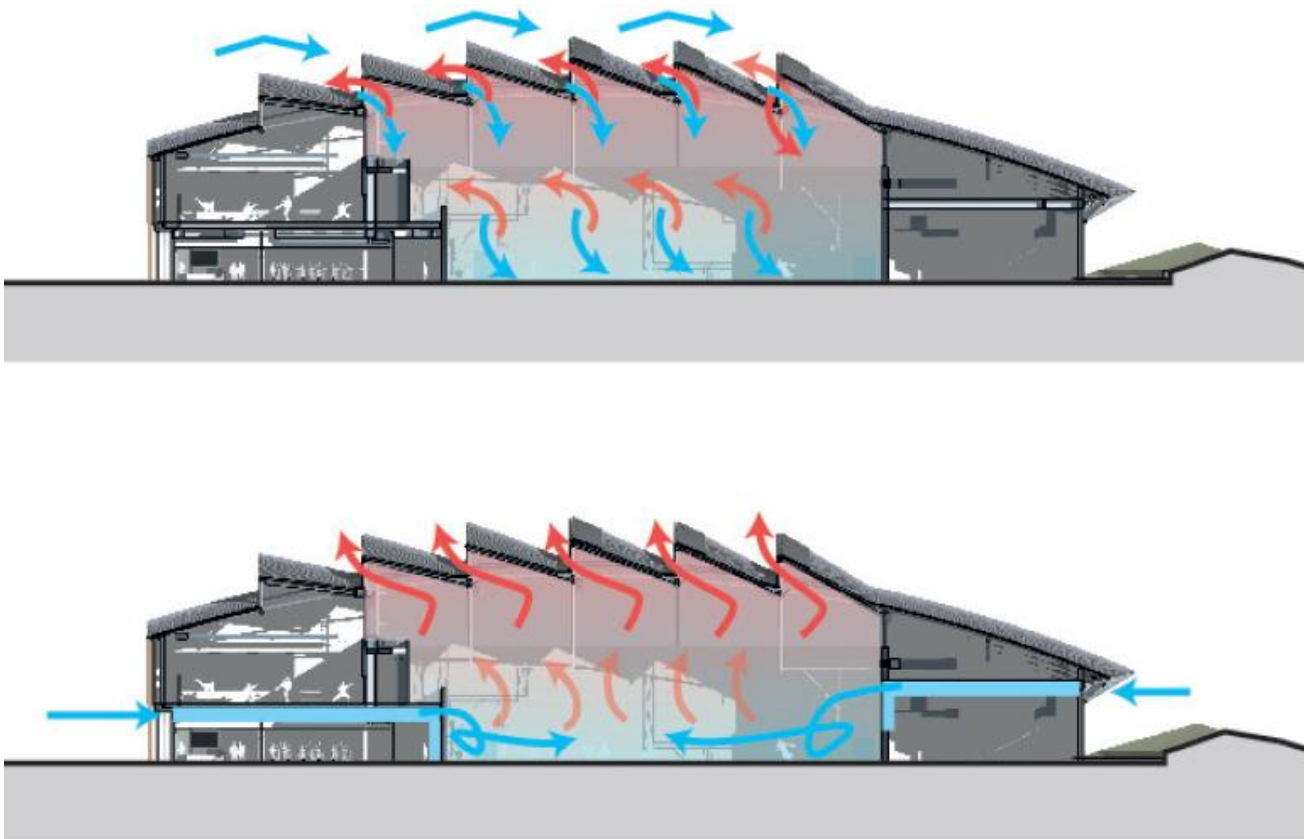


Figure 1: Natural ventilation concept.

Fitness suite

The fitness suite requires temperature and humidity control within the space and is subjected to high sensible and latent heat loads.

To maintain conditions, a full fresh air mechanical ventilation system is provided. The air plant is provided with attenuators, panel and bag filtration, hygroscopic thermal recovery wheel, VRV/VRF cooling coil and LTHW frost and re-heat coils.

The air handling unit is located in the first floor east plant room. Air intake is via an architectural weather louvre. A ductwork plenum to the rear of the louvre enables multiple air plant duct connections. The exhaust ductwork is discharged into the external condenser enclosure via an exhaust plenum and weather louvre. Intakes and exhausts are designed to keep maximum spacing between them to avoid short circuiting.

Supply and extract ductwork is routed above the multipurpose stores at first floor level and drops down in dedicated risers to serve the fitness suite. The risers are half hour fire rated and fire dampers are required where ducts pass through the first floor slab. Supply air is introduced to the space via exposed duct mounted adjustable radial diffusers with core tube for turbulent mixing of the air.

Extract air is via side wall bar grilles located at each end of the space. An extract branch is also provided to the fitness staff office with supply air transferred from the main space via a transfer duct and cross talk attenuator. Cooling to the staff office is via a wall mounted VRV/VRF room unit.

Multipurpose

The multipurpose space is a mixed mode space which can be naturally ventilated when conditions allow. The space can be subdivided into two separate individual spaces and the services are provided to cater for different uses.

Rooflights at high level within the space are motorised and BMS controlled and operate in conjunction with user operated windows.

To maintain conditions, a full fresh air mechanical ventilation system is also provided. The air plant is located in the first floor plant room and will be provided with attenuators, panel and bag filtration, hygroscopic thermal recovery wheel, VRV/VRF cooling coil and LTHW frost and re-heat coils. Air intake is via an architectural weather louvre. A ductwork plenum to the rear of the louvre enables multiple air plant duct connections. The exhaust ductwork is discharged into the external condenser enclosure via an exhaust plenum and weather louvre. Intakes and exhausts are designed to keep maximum spacing between them to avoid short circuiting.

Dependent on wind, rain, temperature and CO₂, the mechanical ventilation will be controlled 'off' by the BMS and the natural ventilation modulated as required via the low and high level openings.

A user override switch is located in the reception to allow the BMS control to be overridden.

Space heating is provided by the air handling plant.

Weights

To maintain conditions, a minimum fresh air mechanical ventilation system with ceiling mounted local terminal VRV/VRF heating/cooling units is provided. The air plant is provided with attenuators, bag filtration, hygroscopic thermal recovery wheel and LTHW frost and re-heat coils.

The air handling unit is located in the first floor west plant room. Air intake is via an architectural weather louvre. A ductwork plenum to the rear of the louvre enables multiple air plant duct connections. The exhaust ductwork is discharged into the external condenser enclosure via an exhaust plenum and weather louvre. Intakes and exhausts are designed to keep maximum spacing between them to avoid short circuiting.

The air handling plant space is restricted and the layouts have been designed around a specific 'cabinet' type air handling unit.

Supply and extract ductwork is routed within ceiling voids above the ground floor changing rooms and corridor. Fire dampers are required where ducts pass through the first floor slab.

Tempered supply air is introduced to the space via ceiling mounted diffusers. Extract air is also via ceiling mounted diffusers.

Room terminal cooling units are either be 4-way type cassette units mounted or concealed within ceiling void and ducted to supply / extract grilles.

Changing rooms

As per the weights room.

In summer peak, to avoid overheating to the space, air will be supplied to the space at a maximum temperature of 20°.

Heating to the changing rooms will be via underfloor LTHW heating systems, provided with local manifold, mixing valve and pump arrangement.

Members/fitness suite: The air handling unit for the fitness changing is located in the first floor west plant room.

Sports hall: The air handling unit for the sports hall changing is located in the ground floor east plant room.

Reception and café area

The reception and café are is a naturally ventilated space. Openable windows are provided for local control.

This area has underfloor heating. Overhead LTHW warm air door heaters are also provided to prevent discomfort when external doors are opened.

Offices

The office spaces are naturally ventilated and are provided with openable windows suitable for winter minimum background ventilation and summertime maximum ventilation. LTHW radiators with thermostatic control valves are provided for heating.

1st floor WC's

Toilets are provided with mechanical extract ventilation and local LTHW low surface temperature radiators (where necessary) with thermostatic control valves.

Server room

Dedicated VRF systems will be provided to the server room on the first floor sized for a maximum 4kW sensible cooling capacity.

Lighting

General Internal Lighting

General artificial lighting is provided in all areas of the building in accordance with the guidelines of the University's Design and Standards Brief. The luminaires are selected to provide energy efficiency balanced with a high level of lighting quality. The primary light sources utilised are linear fluorescent T5, compact fluorescent, and LED. Linear fluorescent, compact fluorescent and LED luminaires are provided with high frequency Dali dimmable ballasts where lights are adjacent to windows. All LED luminaires are provided with passive cooling.

Sports lighting

The University has requested the capability for the Sports Hall to allow training at the highest event class with the most stringent lighting criteria. The Class requirements and descriptions for the various sports are shown in the Table 1:

Sports	Class I (Lux)	Class II (Lux)	Class III (Lux)	Uniformity (Emin/Eav)	Colour Rendering Index
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Badminton	750	500	300	0.7	60
Basketball	750	500	200	0.7	60
Dancing/Aerobics	500	300	200	0.7	60
Fencing	750	500	200	0.8	60
Five-a-side Football	750	500	200	0.7	60
Gymnastics	500	300	200	0.7	60
Handball	750	500	200	0.7	60
Martial Arts	750	500	200	0.7	60
Netball	500	200	75	0.7	60
Table Tennis	750	500	300	0.7	60
Volleyball	750	500	200	0.7	60
Wall Climbing *	500	300	200	0.8	60
Wrestling	750	500	200	0.7	60

Table 1: Class requirements and descriptions for various sports

Lighting Class I – International and national competition, large spectator capacities with long viewing distances, top level supervised training.

Lighting Class II – Mid-level competition; principle local clubs and county regional competition, medium level spectator capacities with medium viewing distances, high level supervised training.

Lighting Class III – Low-level completion; local or small club competition, minimal or no spectator provision, general training; school sports and recreational activities.

Badminton has the most onerous criteria for artificial lighting in each of the classes, along with the most stringent criteria of where the luminaires can be located within the sports hall. For this reason the lighting within the main Sports Hall has been designed to the requirements of Class I badminton for training and events. The lighting controls allow the lighting level to be adjusted for training, other classes of event and other sports.

High bay downlights incorporating high efficiency metal halide lamps are provided within the main Sports Hall to achieve Class I levels of the illumination along with flexibility to allow energy savings during periods when Class I lighting is not required.

The lighting within the Multipurpose room has also been designed to a Class II level of lighting for training and competition; here martial arts has the most onerous criteria and determining the design parameters. The lighting is provided by high bay downlights incorporating high efficiency metal halide lamps.

Lighting Controls

A lighting control system comprising of daylight linking, presence detection, absence detection and manual switching has been installed throughout the building.

Presence Detection

Presence detection is provided within all plant rooms, store rooms, cleaners cupboard, server and repro room, staircases, circulation routes, lift, WC's, showers and changing rooms.

Presence detection detects a person entering the space/room and automatically switches 'on' the lighting within the room. The lighting then remains 'on' for a predetermined time period after which the lighting control system will switch 'off' the lighting. If the presence detector is reactivated by movement during the predetermined time period, the time period is reset and restarts; the lighting remaining 'on'.

Absence Detection

Absence detection is installed within all offices, meeting rooms, first aid room, fitness suite, and weights room.

Absence detection relies on a manual input from the user to bring the lights 'on' if required. The lighting control system then monitors the occupancy of the space and switches the lighting 'off' if no occupancy is detected for a predetermined time period.

This can be combined with daylight linking to automatically dim the lights following a manual user input. A second manual input then overrides the daylight linking to bring the lighting 'on' to 100%.

Daylight Linking

All internal spaces with windows are installed with daylight linking in order to achieve a high building lighting energy efficiency. Where dimmable luminaires are supplied the daylight linking will dim the internal luminaires to predetermined levels in order to achieve the targeted illuminations.

Daylight linking within the main Sports Hall utilises switching instead of dimming as these luminaires cannot be dimmed. The luminaires are divided into three groups to provide four different levels of artificial lighting:

- All luminaires 'off' – Sports Hall in natural daylighting mode,
- 33.3% of luminaires 'on' – Part daylighting or Class III lighting mode,
- 66.6% of luminaires 'on' – Part daylighting or Class II lighting mode,
- 100% of luminaires 'on' – Class I lighting mode

All spaces with daylight linking are provided with manual overrides for maximum flexibility.

External Lighting

External lighting is provided to the landscaping around the main entrance, parking, access road and above all exit doors. This lighting comprises of:

- Compact fluorescent pole top luminaires for the access road and car parking,
- Compact fluorescent bollard luminaires for way finding around the cycle parking and main entrance,
- Wall mounted compact fluorescent over door luminaires for all exit doors.

Daylighting

The University of Cambridge Sports Hall has been optimised to maximize the use of daylighting, utilising the north facing windows to light the main sports and multipurpose halls. In addition to this the Entrance Foyer, Café and fitness suite have a large north facing glazed facade permitting indirect light into the spaces.

Areas such as the Weights room and the Offices also benefit from large areas of glazing permitting natural light into the spaces.

In order to achieve reduced lighting energy consumption through the use of daylight the above spaces will be provided with automatic daylight linking. This is described in more detail within the Lighting Controls Section.

Metering System

The BMS interfaces with the buildings electrical consumption meters via a serial interface (Modbus). The BMS interfaces with the buildings gas and water consumption meters via pulse contacts supplied with the meters. The BMS will display the consumption data for each meter on a daily, weekly and monthly basis.

The AHUs all have a heat meter installed to measure the energy consumed by each AHU. The LTHW circuits all have a heat meter installed to measure the energy consumed by each circuit. The meters are monitored by the BMS via a serial interface. The BMS displays the energy data associated with each meter.

Lifts

The University of Cambridge Sports Hall building is provided with a single 21 person 1600Kg machine-room-less evacuation lift. The lift car has a clear door opening width of 1400mm and a clear height of 2100mm to allow transportation of specialist sports equipment identified by the University. The lift speed is 0.5m/s.

The lift has two power supplies, provided via an automatic changeover switch. The primary supply is fed directly from the main LV switchboard. The secondary supply is derived from a UPS system within the Sports Hall building. It should be noted that UPS systems require regular maintenance and testing to give the best reliability in the event of a power failure.

The lift communications system is linked via BT Redcare line to University's Central Control Room

Emergency Information

Emergency Information

PLEASE CALL 999 IN AN EMERGENCY

For **non-emergencies**:

Police

Parkside Police Station

Parkside
Cambridge
CB1 1JG

Tel: 101

Opening times: Mon - Sun; 8am - 10pm
Bank holidays; 9am - 5pm

Fire

Cambridge Fire Station

TA centre
Coldham's Lane
Cambridge
CB1 3HS

Tel: 01223 403 630

Out of hours: 01223 403 631

Ambulance

Addenbrooke's

Cambridge University Hospitals NHS Foundation Trust
Cambridge Biomedical Campus
Hills Road
Cambridge
CB2 0QQ

Tel : 01223 245 151

General Users

On discovering a fire or hearing the fire alarm the building should be evacuated immediately via your nearest available Fire Exit.

- **Do Not** use the lifts
- **Do Not** stop to collect personal belongings
- Ensure that any doors are shut behind you and proceed to your designated muster point. Remain at the muster point and do not enter the building until an Evacuation Officer communicates it is safe to do so.

All emergency exit routes are signposted.

On making the decision to evacuate each person should exit the building and proceed to the Muster Point located to the north of the building, unless an alternative is specified.

Fire Extinguishers and similar fire fighting systems should only be used by members of staff who have undertaken the necessary training. They are located throughout the building.

Accidents

In the event of an accident contact either the First Aider or the emergency services.

First aid rooms are available. To use a first aid room, contact a first aider who will assist. If you have an accident or a near miss that you feel was potentially serious, it is important you complete an accident or near miss form and submit it to Health and Safety.

Facilities Management

Emergency Escape Lighting

Emergency lighting is provided throughout the building to meet the requirements of BS 5266 comprising of luminaires with self contained 3 hour batteries operating automatically under a mains or local circuit failure condition.

Where possible these luminaires are the luminaires providing the general illumination of the space. Where this is not possible a proprietary surface mount or recessed LED escape luminaire is provided.

Internally illuminated emergency escape signage is provided throughout the building in accordance with BS 5266.

Fire Detection and Alarm Systems

At the request of the University Fire Safety Unit, a category L2, analogue addressable automatic fire detection and alarm system is provided in accordance with BS 5839 and the University's Design Standards and Brief. The system comprises smoke detectors, heat detectors, electronic sounders, beacons, manual call points, and interfaces to all BMS controls panels, audio equipment, and any door hold open devices. The fire alarm system is linked to the University's Central Security Control room via a Redcare system.

The detection system covers the following areas:

- Escape Routes including the entrance foyer, weights room, escape stairs, escape corridors
- All rooms opening onto escape routes other than the sports hall
- Access rooms to inner rooms
- All store rooms and cleaners cupboards/rooms
- All plant rooms
- Manual call points are installed on all final exit doors and to the entrance lobbies of the escape staircases at first floor level.

Fire detection within the main sports hall has been requested by the University Fire Safety Unit.

A single main fire alarm control panel is provided behind the reception desk adjacent to the main entrance. The system is hard wired using approved fire rated cabling with a red low smoke zero halogen emitting outer sheath.

An interface is provided to an automatic pager system to initiate a vibrating signal and text message via radio waves to pagers issued to people with impaired hearing upon arrival to the building.

A private fire hydrant is provided off the existing mains water service feeding the site.

Accidents

The first aid room is located on the ground floor, northeast corner, adjacent to the entrance lobby.

Energy & Environmental Strategy

Energy & Environmental Strategy

The Cambridge University sports centre incorporates features which provide a range of sustainability outcomes, and achieved a BREEAM 'Excellent' rating.

The reasons for using energy-efficient features and strategies are:

- Cambridge University Sports policy and standing as an environmentally and socially conscious organisation
- To conserve the planet's finite natural resources
- To achieve cost savings by minimising the site's utility bills.

General Users

The University of Cambridge Sports Hall has been optimised to maximize the use of daylighting, utilising the north facing windows to light the main sports and multipurpose halls. In addition to this the Entrance Foyer, Café and fitness suite have a large north facing glazed facade permitting indirect light into the spaces. Areas such as the Weights room and the Offices also benefit from large areas of glazing permitting natural light into the spaces.

Only switch the lights ON as and when necessary as they result in significant emissions of CO₂ into the external atmosphere, contributing to global warming.

The heating and ventilation system is similarly controlled by the BMS. If you wish to change the lighting, heating or ventilation levels please contact a member of staff.

PV

The University of Cambridge Sports Centre has 78.75kWp of photovoltaic (PV) solar panels installed on the roof. The sports centre's renewable energy requirement is based on predicted CO₂ emissions and aims to offset 10% of the development's predicted annual CO₂ emissions.

Facilities Management

The sports centre is designed to be better than the good practice benchmarks for energy consumption and CO₂ emissions as set out in ECG 78 Sports and Leisure Buildings. These are as follows:

	<i>Good practice benchmark</i>		
	<i>Electricity</i>	<i>Natural gas</i>	<i>Total energy</i>
Building energy consumption (MWh/year)	529	940	1,469
Building CO₂ emissions	273,500	186,100	459,600

Table 2: Minimum energy and CO₂ targets

To achieve the minimum energy and CO₂ performance targets the sports centre was designed to fabric U-values of: roof = 0.2; walls = 0.25; floor = 0.2, and; windows = 1.8. In addition, the building has an air permeability rate of 3.93m³/hr/m² @ 50Pa.

Monitoring

In order to comply with the British Building Regulations the University of Cambridge Sports Centre building is provided with a metering system in accordance with CIBSE TM39. The metering system comprises of meters

interconnected by a Modbus metering network connected to the building management system (BMS) outstations.

The meter readings are to be collated, represented and stored on a graphical user interface as part of the building management system. An aspect of virtual metering will need to be carried out by the BMS software to meet the requirements of TM39.

PV

The University of Cambridge Sports Centre's renewable energy requirement is based on predicted CO₂ emissions and aims to offset 10% of the developments predicted annual CO₂ emissions.

The sports centre has 78.75kWp of photovoltaic (PV) solar panels installed on the roof. To provide this output there are 315 SOLON SOLraise Black 230/02 250Wp Mono-crystalline units. These are mounted in 12 strings and connected to 6 inverters, located on the roof.

Water Use

Water Use

General Users

Water efficiency measures have been incorporated to avoid the wastage of water. Water efficient measures include:

- Infra red actuated taps
- Dual flush water closets
- Aerating showers
- Flow restrictors

Water efficient 'Dual Flush' toilets are installed throughout the sports centre to reduce the quantity of water consumed for non-essential purposes. This reduces the impact on the environment and will save money on the water utility bill.

All taps and showers are fitted with infra red sensors, flow restrictors and are aerated. This reduces water consumptions and therefore the impact on the environment. It will also save money on the water utility bill.

Do not waste water.

Facilities Management

Mains Cold Water

The Sports Centre is provided with a single mains water supply (MCWS) connection from the existing mains water service feeding the site from the eastern boundary. The incoming water supply is provided with an external meter pit which houses the main isolation valves and the Cambridge Water Company utility meter. The supply enters the building within the water storage plantroom at ground floor. All drinking water points within the building are supplied directly from the MCWS.

In line with the Design and Standards Brief, water check meters with pulsed outlets monitored by the BMS system will be provided on the supply pipework to the water storage tank and the dedicated cold feed to hot water cylinders.

Water Storage

A GRP two compartment potable cold water storage tank fed from the MCWS is provided with an approximate capacity of 56m³ within the ground floor plantroom. The tank has been sized to hold sufficient water to cover the opening times (6:30am/10:00pm) and predicted usage of the Sports Centre.

The Cambridge Water Company (CWC) restriction of 3 litres/second to the site results in a tank refill time of approximately 5 hours.

Domestic Water Systems

A boosted cold water service (BCWS) is provided to all changing areas, toilets, staff areas, first aid room and plantrooms within the Sports Centre. This includes wash hand basins, cleaner's sinks, showers, WC's and a fill points for the mechanical plant.

The main domestic hot and cold water distribution pipework is distributed from the ground floor water storage plantroom to run horizontally within the services voids/corridors to all ground floor areas. The pipework to the first floor level rises in a dedicated riser to serve the staff toilet and cleaners sink.

Isolation, flushing and injection points are provided at suitable locations to facilitate flushing through and sterilisation for future maintenance.

Water efficiency measures have been incorporated to avoid the wastage of water. Water efficient measures include:

- Infra red actuated taps
- Dual flush water closets
- Aerating showers
- Flow restrictors

Domestic Hot Water System

A boosted domestic hot water flow and return service (BHWSF/BHWSR) is provided to all changing areas, toilets, staff areas and the first aid room. This includes lavatory basins, sinks and showers.

The system water temperature is maintained at a minimum of 55°C with a pumped secondary hot water circulation system. Thermostatic mixing (TMV's) valves are provided at all wash hand basins and showers. TMV's will not be provided to sinks and cleaners sinks.

The hot water is generated by two direct gas fired water heaters with a buffer vessel for each heater.

Transport Facilities

Transport Facilities

General Users

Car and taxi – access to the University of Cambridge West Cambridge Site is from Maddingley Road and the M11; access to the sports centre site is from Charles Babbage Road.

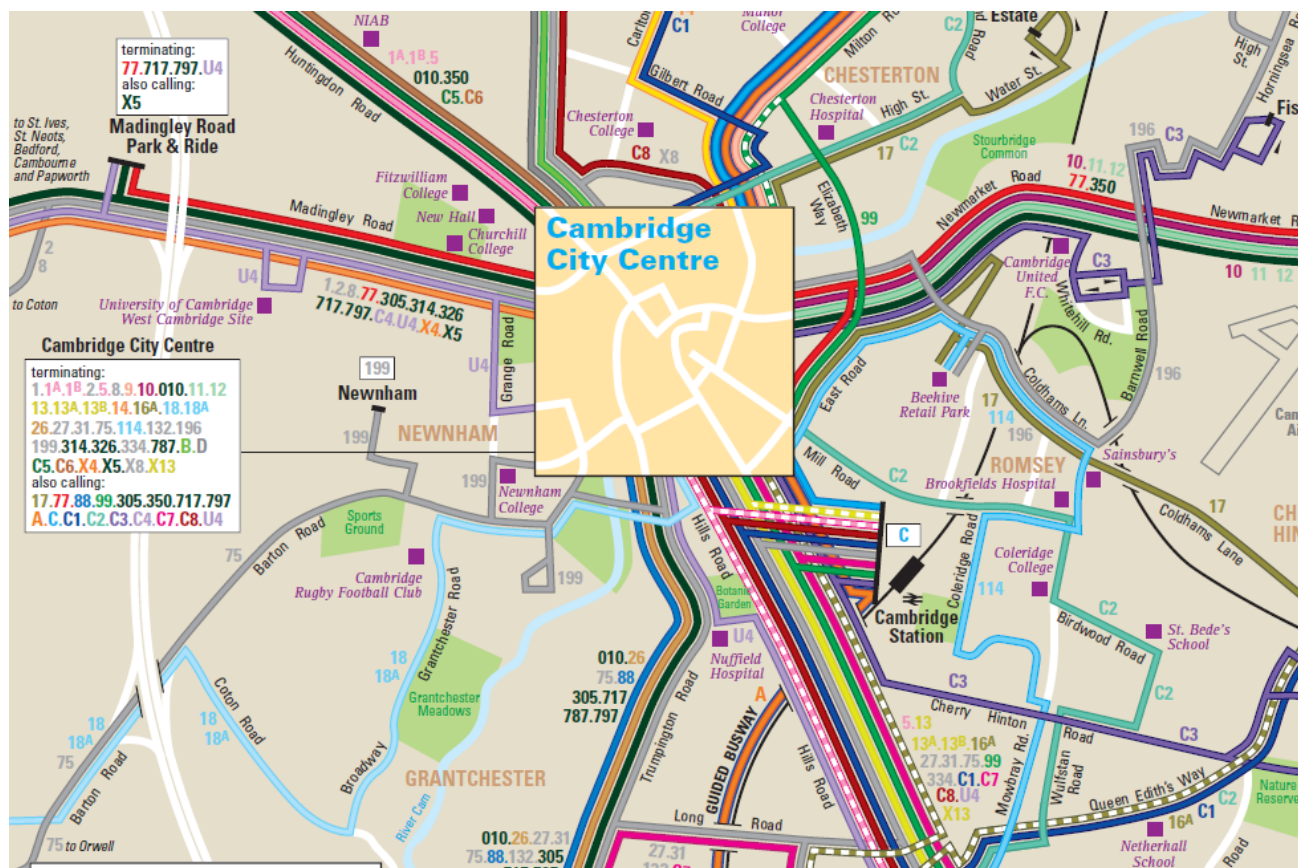
Staff and patrons are encouraged to use alternative modes of transport if practicable. By doing so, the impact on the environment will be reduced.

Parking - Parking is provided throughout the University of Cambridge West Cambridge Site. However, parking at the sports centre is limited to 10 parking bays, designated for use by disabled motorists, in order to encourage patrons to use alternative modes of transport.

Setting Down Points - the arrival forecourt of the sports centre will include a vehicular setting down areas.

Alternative modes

Bus – A bus stop is located at the junction of Charles Babbage Road and the access road to the sports centre site. The 1, 2, 8, 77, 305, 314, 326, 717, 797, C4, U4, X4, X5, bus routes pass along Maddingley Road and connect to the city centre. Buses provide wheelchair access.

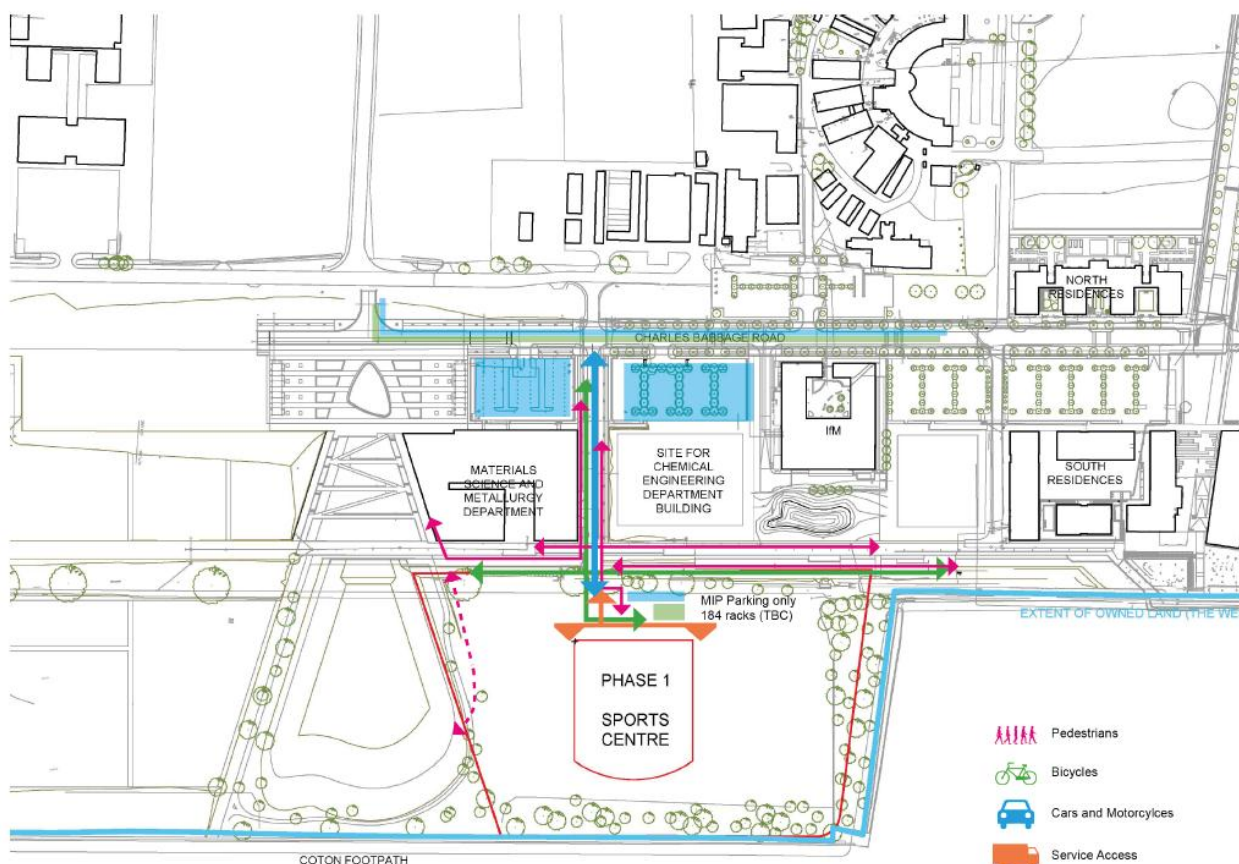


Bus route information, including real time smartphone apps, can be found at the following webpage:
<http://www.cambridgeshire.gov.uk/transport/around/buses/>.

Cycle – A cycle path along the canal colonnade connects to the city centre cycle network and continues over the M11 via a cycle/foot bridge.

There are 188 cycle spaces provided for patrons of the UoC Sports centre. These are covered and lit, and provided with stainless steel ‘Sheffield’ style holders for two bikes. Four changing and locker rooms for males and females (two female and two male changing rooms) are provided on the ground floor of the sports centre, and a total of 401 lockers (of which 7 are accessible lockers and 12 d lockers) lockers are be provided, with 27 showers.

Pedestrian – the Coton footpath connects the city centre (via Wilberforce Road) to the colonnade canal and continues over the M11 via a cycle/foot bridge.



Facilities Management

Access to the site is open to the public: car parking and cycle racks are not protected by any on site security features.

There are 188 cycle spaces provided for patrons of the UoC Sports centre. These are covered and lit, and provided with stainless steel ‘Sheffield’ style holders for two bikes. Parking at the sports centre is limited to 10 parking bays, designated for use by disabled motorists, in order to encourage patrons to use alternative modes of transport.

Materials & Waste Policy

Materials & Waste Policy

Information on the location of recyclable materials storage areas and how to use them appropriately.

General User

The University of Cambridge Sports Centre has been designed to facilitate the collection of two waste streams: dry, mixed recyclables, and; residual waste.

The mixed, dry recyclable waste stream includes materials such as paper, cardboard, glass, plastic, Tetra packs and cans. The residual waste stream includes all those remaining materials that cannot readily be recycled, including food and other organic wastes.

Bins are located throughout the Sports Centre which will facilitate the source segregation of waste in to mixed, dry recyclables and residual waste. These bins have signage to encourage the participation of source segregation. All signage and bin colours are in line with other buildings within the West Campus.

Cleaning teams will collect waste periodically throughout the day and transfer the waste to the large storage bins.

Battery Sets

Cells and batteries must be properly disposed of through an authorized lead disposal centre, on NO ACCOUNT must they be disposed of in general waste.

Facilities Management

As above, plus:

Waste will be collected from the Sports Centre using a conventional container and vehicle system, in line with waste collection from the other buildings on the West Campus.

In addition to the recyclable and residual waste streams, small amounts of other wastes will be produced by specific areas for which separate collection arrangements will have to be made by Facilities Management. These arrangements may be made with the environment office of the University Estate Management, and will include:

- Sanitary waste from WC's
- Medical waste from first aid room
- Bulky waste (such as broken furniture or sports equipment)
- Waste electrical and electronic equipment (WEEE) such as toner cartridges, batteries and fluorescent tubes.

The café is operated as a commercial operation. As such, the waste generated will need to be treated separately from that of the Sports Centre: this should be collected and stored separately and the operator of the café is responsible for arranging collection of this waste separately from that of the Sports Centre.

Facilities Management are responsible for emptying the bins in the Sports Centre and transferring the bagged waste to the waste room, where it will be placed in the relevant 1,100 litre Eurobin.

The waste rooms containing the waste storage bins are located at the North-East and North-West corners of the Sports Centre, and are access via external doors. Each room contains two storage bins (one room for

recyclable waste, and the other room for residual waste) and is 1,800mm by 3,300mm. They both have doorways with clear opening widths of 1,600mm and contain a tap and gulley for wash-down purposes.

Contact your local authority to determine how and where fluorescent tubes and batteries can be disposed of carefully, safely and within the COSHH Regulations.

Lamps

Lamp disposal can damage your health and should comply with Control of Substances Hazardous to Health (COSHH) regulations.

Fluorescent or sodium lighting is now considered a producer of hazardous waste and must be disposed of by a specialist company. Fluorescent tubes contain mercury, cadmium and lead, all recognised as very toxic metals. They can be very harmful to health, even in small quantities that can hardly be measured. They also easily and rapidly pollute water courses and the environment in general unless disposed of correctly.

All failed lamps, bulbs and light filaments are to be collated in a lamp receptacle and disposal made via a specialist sub-contractor.

Battery Sets

Cells and batteries must be properly disposed of through an authorized lead disposal centre, on NO ACCOUNT must they be disposed of in general waste.

Refer to the CONTROL OF POLLUTION ACT Special Waste Regulations.

Contact your local authority to determine how and where fluorescent tubes and batteries can be disposed of carefully, safely and within the COSHH Regulations.

Re-fit/Re-arrangement Considerations

Re-fit/Re-arrangement Considerations

General Users

Furniture can be rearranged temporarily according to staff needs.

If furniture is moved then it should be relocated to its original position once the need for its rearrangement has ended.

No member of staff should attempt to adjust or tamper with the power sockets throughout the office other than the designated, qualified technicians.

No blockage of fire exits will be permissible as this represents a serious fire hazard. Any furniture located in this position must be moved immediately.

No blockage of the ceiling or wall mounted ventilation grilles will be permissible. Blockage of grilles can cause damage to the ventilation system, impact the health and wellbeing of other building users and will increase the building's consumption of energy.

Where desks and computers are to be moved ensure that screen glare has been reduced and the workplace lighting is suitable.

Facilities Management

Although no building modifications are planned, it may be likely that new phases of re-arrangement, expansion and refit can be expected at a later date. In this instance, it is recommended that FM consider the 'best practice' environmental practices of the time, such as those outlined in the BREEAM standard. Practices to consider might include some of the following:

- The use of natural ventilation rather than air-conditioning
- Re-use of materials from the original construction (flooring, furniture and fittings)
- Use of environmentally certified materials (those in the Green Guide to Specification)
- Installation of renewable energy technologies
- Additional riser or duct space to assist future flexibility
- Installation of additional or best-practice systems that will remain suitable if user levels rise above those designed for

Information on any future modifications made should be logged and securely stored for future reference.

Information on environmental best-practices should be passed on to the personnel in charge of management decisions, so they are aware of the implications of such decisions on the management of the building.

Reporting Provision

Reporting Provision

Contact details

General Users

Front reception desk:

01223 357645

Facilities manager:
Tom Walston
Head of Facilities & Catering

01223 337767

Estates Management
Laundry Farm
Barton Road
CB3 9LH

First aid:
Simon Cornish
Physical Education Department

01223 336999

Physical Education Dept
Fenner's
Physical Education Centre
Gresham Road
Cambridge
CB1 2ES

Facilities Management

Contractor contact:
Bill Bain (SDC)
Phil Joyce (SDC)

01234 363 155

SDC Builders Limited
Limegrove House
Caxton Road
Bedford
MK41 0QQ

Architect, M&E, civil engineering:
Arup Associates

+44 (0)20 775 55555

Arup Associates
8 Fitzroy Street
Boston House
London
W1T 8BJ

University of Cambridge:
John Woods

01223 337733

Training

Training

General Users

Building users are not required to undergo training in the use of the building. If you have any issues with the building or its operation, please contact a member of the FM team.

Facilities Management

The following training was undertaken during the handover period:

UoC Sports Centre Training Matrix				
Equipment and Services	Responsibility for Training	Approx.Training Duration	Start / Finish Times	Training Date
Mechanical Services				
Mechanical Services Overview Plant Rooms	KMS	3 hrs	09.00 to 12.00	Monday 10-June-13
Incoming Gas & Water	KMS	0.5 hr	12.00 to 12.30	
Hot & Heating Boilers	KMS	1 hrs	13.30 to 14.30	
Underfloor Heating	KMS	1 hr	14.30 to 15.30	
Over Door Heaters	KMS	0.5 hr	15.30 to 16.00	
Pumps & Inverters	KMS	1 hr	16.00 to 17.00	
AHU	KMS	6 hrs	10.00 to 14.00	Tuesday 11-Jun-13
Ventilation / Natural Ventilation	KMS	2 hrs	14.00 to 16.00	
AC Units	KMS / Quality Air	3 hrs	10.00 to 13.00	Wednesday 12-Jun-13
Sanitary Ware / Showers	KMS	3 hrs	13.30 to 16.30	
Building Management Systems				
Overview BMS Outstations Panels 1 to 6	Aqua Imtech	3 hrs	10.00 to 13.00	Thursday 13-Jun-13 (onsite)
Northlights Window Actuators	Aqua Imtech / Naco / Window Master	2 hrs	13.00 to 14.30	
BMS Metering Systems	Aqua Imtech / Marshall Tufflex	2 hrs	10.00 to 12.00	Friday 14-Jun-13 (Laundry Farm)
Head End Graphics	Aqua Imtech	2 hrs	12.30 to 14.30	
Solon PV Panels Monitoring	Ecolution	2 hrs	14.30 to 16.30	Friday 14-Jun-13 (Laundry Farm)
Electrical Services				
Fire Alarm System	BBC Fire Systems	3 hrs	14.00 to 17.00	Friday 07-Jun-13
Electrical Services Overview	T Clarke	2 hrs	10.00. to 11.00	Monday 17-Jun-13
Electrical Distribution / Incoming Services	T Clarke	2 hrs	11.00 to 12.00	
Lighting / Controls / External Lighting /Switching	T Clarke	3 hrs	13.00 to 14.30	
Emergency Lighting	T Clarke	3 hrs	14.30 to 15.30	
Structured Cabling Systems	T Clarke	1 hr	15.30 to 16.30	
Intruder Alarm	Chubb	1 hr	10.00 to 11.00	Wednesday 19-Jun-13

CCTV Systems	Chubb	1 hr	11.00 to 12.00	
Disabled Alarm	Chubb	1 hr	12.00 to 13.00	
Access Control	Chubb, ASP & MRM	3 hrs	13.30 to 16.30	
PA System	Aqord	2 hrs	10.00 to 12.00	Thursday 20-Jun-13
Lightning Protection	T Clarke	1 hr	10.00 to 11.00	Monday 17-Jun-13
Specialist Services				
Evacuation Lift	Dab Lifts	4 hrs	10.00 13.00	Thursday 20-Jun-13
UPS / Automatic Changeover Switch	T Clarke	4 hrs	13.30 to 14.30	
Retractable Seating	Auditoria Services	2 hrs	10.00 to 12.00	Friday 21-Jun-14
Booking System	MRM	2 hrs	10.00 to 12.00	Wednesday 19-Jun-14
Scoreboard /Shot Clocks	BROXAP	2 hrs	10.00 to 12.00	Friday 21-Jun-14
Photo Voltaics	Ecolution	2 hrs	12.30 to 14.30	Friday 21-Jun-13

Links & References

Links & References

Carbon Trust

www.carbontrust.co.uk

Environment Agency

www.environment-agency.gov.uk

BREEAM

www.breeam.org

General

General

Where further technical detail may be entered by the FM Team.